117. (new) An apparatus according to claim 110, wherein the first light, the second light, and the third light are each one of red light, green light, and blue light.

REMARKS

A Petition pursuant to 37 CFR § 1.136(a) and the fee required by 37 CFR §1.17(a)(1) are submitted herewith. The due date for response to the Official Action mailed July 17, 2001 (Paper No.16) is now November 17, 2001.

Claims 2-4, 9-11, 13, 15-17, 22-24, 26, 28-30, 35-37, 39 and 40-69 have been canceled.

Claims 1, 7, 8, 14, 20, 21, 27, 33 and 34 have been amended to distinguish more clearly over the cited reference to Nagano (U.S. Patent No. 4,642,679).

New claims 70-117 have been added to provide a more complete measure of protection for this invention.

In the Official Action it was stated that applicant's claim language is too broadly written to distinguish over Nagano in that an operation of the lights being turned on and off during a period in which no image sensing operation is performed takes place for each cycle corresponding to a given reading line. The Action further states that since there are a plurality of reading lines in Nagano, and therefore a plurality of reading cycles, the Nagano reference may be interpreted to disclose that turning on and off of a particular lamp takes place a plurality of times during non-sensing intervals.

Claim 1 has been amended to specify

> "a signal generator unit which generates a trigger signal for triggering an operation of sensing one line of one image;

> "a light source control unit which controls . . . such that, in a non-sensing period in which no image sensing operation is performed, the first, the second, and the third light sources are sequentially turned on and off by the light source control unit in this order before a next trigger signal is generated."

As amended, claim 1 makes clear that a trigger signal triggers sensing of one line of the image and that the first, second and third light sources are sequentially turned on and off before the next trigger signal is generated. That is, the turning on and off of the light sources occurs between the sensing of successive lines of an image. This is made more definite in claim 1 where it stated that:

> "the non-sensing period is such a period during which no trigger signal is generated over a length of time greater than the length of time of a one-line sensing period".

As previously explained, this permits more efficient light stabilization when no image is being sensed.

While Nagano discloses a plurality of reading lines, Nagano may not be interpreted to disclose turning on and off of a lamp during a non-sensing interval which occurs between the reading of successive lines of an image. This is clear from Nagano's specification.

In his SUMMARY OF THE INVENTION, Nagano states:

> "It is also an essential object of the present invention to provide a color image reading device which can eliminate noise signals caused by the afterglow of a green lamp that exists during the red light exposure and blue light exposure."

The operation of the Nagano device is described beginning at Col. 8, line 22. As is clear from this description, the operation is divided into three operations, namely an afterglow storing operation, a shading reference setting operation, and an original reading operation.

The afterglow storing operation (Col. 8, line 38 to Col. 9, line21) occurs when a

white zone 70 is aligned to the reading line RL, i.e. before any reading if an image. Here, the green lamp is turned on and off and the afterglow which would occur during subsequent red and blue reading periods is read for those periods and is stored in Se and Si memories 221a and 221b so that the value of the green afterglow which would occur during those periods can be subtracted from the red an blue readings. This eliminates the effects of the green afterglow from the red and blue readings.

Immediately after the afterglow storing operation is completed, the shading reference setting operation takes place (Col. 9, line22 to Col. 10, line 34). This operation also takes place while the white zone 70 remains in alignment with the reading line, i.e., prior to any sensing of an image. During this operation the green, red and blue lamps are lit to produce signals which are used to effect white balance.

Neither the afterglow storing operation nor the shading reference setting operation takes place between the line-by-line reading operations. Both the afterglow storing operation and the shading reference setting operation take place before any line-by-line reading operation.

After the afterglow storing operation is completed, the platform is then scanned to position the original in alignment with the reading line RL (Col. 10, line 35 to Col. 12, line10). At this point, the reading of an image takes place on a line by line basis.

The Nagano patent, however, gives no disclosure of any turning on and off of his green, red or blue lamps between successive image line readings. In fact, if Nagano's green, red and blue lamps were turned on and off during these interline reading periods, such turning on and off would serve no purpose and would likely adversely affect the ability of Nagano's device to properly use the stored green afterglow values and the stored white balance values to correct the red and blue

readings and the white balance.

In the Official Action it is stated that Nagano discloses that the turning on and off of a particular lamp takes place a plurality of times during non-sensing intervals (Official Action, page 2, paragraph 2). In this regard, the amendments to claim 1 set forth a clear distinction over Nagano.

In the image sensing apparatus according to claim1, the first, the second, and the third light sources are controlled such that lights are sequentially turned on and off in this order during a non-sensing period before a next trigger signal is generated. Herein the non-sensing period is such a period during which no trigger signal is generated over a length of time greater than the length of time of a one-line sensing period. This is not disclosed in Nagano. The lack of this idea in Nagano is clear because Nagano only discusses the operation within one cycle (Nagano, Fig.11). The lack of this idea in Nagano is also clear from the fact that, in Nagano, the lamp is driven in a different manner after the end of a non-sensing period from the manner in which the lamp is driven during the non-sensing period (Nagano Fig. 20). This means that Nagano cannot achieve the advantage of the present invention regarding the simple circuit configuration which can be achieved by turning on and off the light sources in a similar manner both in non-sensing periods and one line sensing periods.

In view of the forgoing, it is submitted that claim 1, as now amended, patentably distinguishes over Nagano and is allowable.

Claims 5-8 and 12 are each dependent on claim 1 and patentably distinguish over Nagano for the reasons given above for claim 1. Further, the specific structures defined by dependent claims 5-8 and 12 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 5-8 and 12 patentably

distinguish over Nagano and are allowable.

Claim 14 is a method counterpart of claim 1 and contains, in method terms, the same limitations discussed above which distinguish claim 1 from Nagano. Accordingly, claim 14 patentably distinguishes over Nagano and is allowable.

Claims 18-21 and 25 are dependent on claim 14 and patentably distinguish over Nagano for the reasons given above for claim 14. Further, the specific methods defined by dependent claims 18-21and 25 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 18-21 and 25 patentably distinguish over Nagano and are allowable.

Claim 27 is directed to a control memory which contains a program for carrying out the method of claim 14. This program, as defined in claim 27, specifies each of the method steps whose apparatus counterparts patentably distinguish over Nagano, as discussed above in regard to claim 1. Accordingly, claim 27 patentably distinguishes over Nagano and is allowable.

Claims 31-34 and 38 are each dependent on claim 27 and patentably distinguish over Nagano for the reasons given above for claim 27. Further, the specific programs defined by dependent claims 31-34 and 38 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 31-34 and 38 patentably distinguish over Nagano and are allowable.

New claim 70 is directed to a feature wherein only the first light is emitted during the non-sensing portion of line by line sensing sequence and wherein, if a trigger signal is generated during the non-sensing portion, the emission of the one light (the first light) is stopped, and the second light,, the third light and the first light are sequentially emitted in this order.

In the image sensing apparatus according to claim 70, if a trigger signal is

generated in a non-sensing period, emission of the first light is stopped and the second light, the third light, and the first light are sequentially emitted in this order.

There is no disclosure in Nagano of stopping the emission of the first light in response to a trigger signal generated in a non-sensing period and then sequentially emitting the second, third, and first light. The lack of the idea in this regard in Nagano is clear from the fact that the green light is afterglow (Nagano, Fig. 11).

Accordingly, claim 70 patentably distinguishes over Nagano and is allowable.

Claims 71-77 are each dependent on claim 70 and patentably distinguish over Nagano for the same reasons given above for claim 70. Further, the specific structures defined by dependent claims 71-77 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 71-77 patentably distinguish over Nagano and are allowable.

Claim 78 is a method counterpart of claim 70 and contains, in method terms, the same limitations discussed above which distinguish claim 70 from Nagano. Accordingly, claim 78 patentably distinguishes over Nagano and is allowable.

Claims 79-85 are dependent on claim 78 and patentably distinguish over Nagano for the reasons given above for claim 78. Further, the specific methods defined by dependent claims 79-85 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 79-85 patentably distinguish over Nagano and are allowable.

Claim 86 is directed to a control memory which contains a program for carrying out the method of claim 78. This program, as defined in claim 86, specifies each of the method steps whose apparatus counterparts patentably distinguish over Nagano, as discussed above in regard

to claim 78. Accordingly, claim 27 patentably distinguishes over Nagano and is allowable.

Claims 87-93 are each dependent on claim 86 and patentably distinguish over Nagano for the reasons given above for claim 86. Further, the specific programs defined by dependent claims 87-93 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 87-93 patentably distinguish over Nagano and are allowable.

Claim 94 is directed to another aspect of the invention wherein the second light is emitted if the first light was being emitted when a trigger signal is generated and the first light is emitted if a light other than the first light was being emitted when a trigger signal is generated.

In the image sensing apparatus according to claim 94, the light source is controlled so that predetermined light is emitted when a trigger signal is generated in a non-sensing period. Herein, the predetermined light is the second light in the case where the first light is being emitted when the trigger signal is generated, while the predetermined light is the first light in the case where light other than the first light is being emitted when the trigger is generated. Nagano does not disclose that in the case where light other than the first light is emitted when a trigger signal is generated in a non-sensing period, the first light is emitted in response to the generated trigger signal. This is clear because, in Nagano, the green light is emitted during most periods (Nagano, Fig. 11).

In general, when the amount of sensed image data accumulated in a memory becomes large, accumulation of new image data into the memory is stopped and the amount of data stored in the memory is reduced. As a result, there is created a non-sensing period during which the operation of sensing an image is not performed.

Furthermore, to ensure that red light, green light, and blue light, which are sequentially emitted, strike the same part of a subject to be sensed, the following process is generally

performed. That is, in general, after sequentially emitting red, green, and blue light, the relative position between the subject and the sensing unit is changed and red light, green light, and blue light are sequentially emitted again. A non-sensing period generally occurs between an operation of emitting red, green and blue light and a next operation of emitting light.

In conclusion, the present application can provide the following advantage which cannot be achieved by Nagano.

In the present application, even when a non-sensing period occurs between a one-line sensing period and a following one-line sensing period, variations n light intensities and wavelength distributions can be suppressed which would otherwise be created by the occurrence of the non-sensing period. Thus, in the present invention, for example, when one sheet of document is sensed, it is possible to prevent the image of the document from being sensed differently from one line to next, and thus it is possible to prevent the image from being degraded due to the line-by-line variation (page 31, lines 1-8).

For the foregoing reasons, claim 94 patentably distinguishes over Nagano and is allowable .

Claims 95-101 are each dependent on claim 94 and patentably distinguish over Nagano for the reasons given above for claim 94. Further, the specific structures defined by dependent claims 95-101 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 95-101 patentably distinguish over Nagano and are allowable.

Claim 102 is a method counterpart of claim 94 and contains, in method terms, the same limitations discussed above which distinguish claim 94 from Nagano. Accordingly, claim 102 patentably distinguishes over Nagano and is allowable.

Claims 103-109 are dependent on claim 102 and patentably distinguish over Nagano for the reasons given above for claim 102. Further, the specific methods defined by dependent claims 103-109 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 103-109 patentably distinguish over Nagano and are allowable.

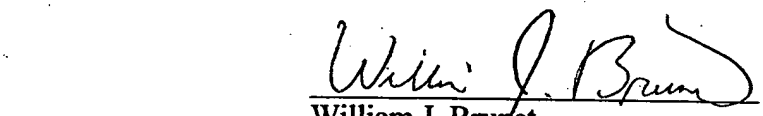
Claim 110 is directed to a control memory which contains a program for carrying out the method of claim 102. This program, as defined in claim 110, specifies each of the method steps whose apparatus counterparts patentably distinguish over Nagano, as discussed above in regard to claim 94. Accordingly, claim 110 patentably distinguishes over Nagano and is allowable.

Claims 111-117 are each dependent on claim 110 and patentably distinguish over Nagano for the reasons given above for claim 110. Further, the specific programs defined by dependent claims 111-117 provide additional advantages, as can be appreciated from the specification, as well as additional novelty, and for these reasons also claims 111-117 patentably distinguish over Nagano and are allowable.

It is submitted that in view of the foregoing amendments and remarks, all of the claims of this application are -*patentable and that this application is in condition for allowance. Further consideration by the Examiner and allowance of this application is respectfully requested.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES TO CLAIMS

1. (twice amended) An image sensing apparatus comprising:

(a) first, second and third[a plurality of] light sources which emit light which are[for emitting light with] different in wavelength[wavelengths];

(b) a signal generator unit which generates a trigger signal for triggering an operation of sensing one line of one image;

(c) a sensing unit which, in response to the trigger signal, outputs a signal of one line of the image illuminated by the light source

[image sensing means for sensing an image illuminated by said light sources and outputting an image signal]; and

light source control unit which controls such that the first, the second, and the third light sources are sequentially turned on and off in this order in a one-line sensing period in which one line of the image is sensed by the sensing unit and such that, in a non-sensing[controlling means for controlling said plurality of light sources so that a predetermined light source of said plurality of light sources is turned on a plurality of times and is turned off a plurality of times during a] period in which no image sensing operation is performed, the first, the second, and the third light sources are sequentially turned on and off by the light source control unit in this order before a next trigger signal is generated, wherein the non-sensing period is such a period during which no trigger signal is generated over a length of time greater than the length of time of a one-line sensing period[by said image sensing means].

Claims 2 - 4 have been canceled.

7. (amended) An apparatus according to claim 1, wherein the sensing unit outputs a signal a plurality of times during a one-line sensing period[said light source controlling means turns on said plurality of light sources during both a period in which an image sensing operation is performed by said image sensing means and a period in which no image sensing operation is performed].

8. (amended) An apparatus according to claim 7, wherein said sensing unit outputs a signal once during a one-line sensing period[light source controlling means turns on said plurality of light sources at the same time so that said image sensing means may sense an image in a monochrome mode].

Claims 9 - 11 and 13 have been canceled.

14. (twice amended) A method of sensing an image, comprising the steps of:

(a) emitting light which is different in wavelength from first, second, and third light sources;

(b) generating a trigger signal for triggering an operation of sensing one line of an image;

(c) in response to the trigger signal, outputting one line of the image illuminated with the emitted light; and

(d) in addition to sequentially turning on and off the first, the second, and the

third light sources in this order in a one-line sensing period, turning on and off the first, the second, and the third light sources in this order in a non-sensing period before a next trigger signal is generated, wherein the non-sensing period is such a period during which no trigger signal is generated over a length of time greater than the length of time of a one-line sensing period[illuminating an image by a plurality of light sources which emit light with different wavelengths thereby sensing said image; and turning on and turning off a predetermined light source of said plurality of light sources a plurality of times during a period in which no sensing operation is performed].

Claims 15 - 17 have been canceled.

20. (amended) A method of sensing an image according to claim 14, wherein the sensing unit outputs a signal a plurality of times during a one-line sensing period[said plurality of light sources are turned on during both a period in which an image sensing operation is performed and a period in which no image sensing operation is performed].

21. (amended) A method of sensing an image according to claim 20, wherein said sensing unit outputs a signal once during a one-line sensing period[plurality of light sources are turned on at the same time thereby sensing an image in a monochrome mode].

Claims 22 - 24 and 26 have been canceled.

27. (twice amended) A control memory in which is stored a program comprising[for controlling an image sensing apparatus to perform] the steps of:

(a) emitting light which is different in wavelength from first, second, and third light sources;

(b) generating a trigger signal for triggering an operation of sensing one line of an image;

(c) in response to the trigger signal, outputting one line of the image illuminated with the emitted light; and

(d) in addition to sequentially turning on and off the first, the second, and the third light sources in this order from in a one-line sensing period, turning on and off the first, the second, and the third light sources in this order in a non-sensing period before a next trigger signal is generated, wherein the non-sensing period is such a period during which no trigger signal is generated over a length of time greater than the length of time of a one-line sensing period[illuminating an image by a plurality of light sources which emit light with different wavelengths thereby sensing said image; and turning on and turning off a predetermined light source of said plurality of light sources a plurality of times during a period in which no sensing operation is performed].

Claims 28 - 30 have been canceled.

33. (amended) A control memory according to claim 27, wherein said program causes the sensing unit to output a signal a plurality of times during a one-line sensing period[[turns on said plurality of light sources during both a period in which an image sensing operation is performed and a period in

which no image sensing operation is performed].

34. (amended) A control memory according to claim 33, wherein said program causes said sensing unit to output a signal once during a one-line sensing period [turns on said plurality of light sources at the same time thereby sensing an image in a monochrome mode].

Claims 35 - 37, 39 and 40 - 69 have been canceled.